

MECHANICAL, ELECTRICAL, AND PLUMBING

DESIGN CRITERIA DOCUMENTATION

SAMPLE FORMAT

1.0 HEATING, VENTILATION, AND AIR CONDITIONING

1.1 DESIGN CONDITIONS

Outdoor design conditions shall be as described in "Guidelines and Energy Conservation Parameters for Terminal Facilities".

Summer and winter indoor design conditions shall be as described in "Guidelines and Energy Conservation Parameters for Terminal Facilities".

Building cooling load calculations should include the effects of heat lag (thermal inertia) by time averaging the instantaneous heat gains over a period of time based upon the type of construction.

Psychometric calculations shall be illustrated on psychometric charts.

1.2 HEATING

Provide a description of the source of heat energy to be used, such as extension of central heated water, resistance electricity, or independent heating facility, and the type of fuel. If existing central system is to be used, provide calculation of estimated demand on the system, and, if the project is a retrofit, statement of comparison of demand of the system being removed/modified to the proposed system. If the existing central system is not to be used, include an explanation as to why the proposed source was selected in lieu of the central system.

Provide a brief description and/or drawings of the type and routing of the proposed heating system.

Provide a description and/or schematics of the type of heating and system to be used within the spaces. Provide reasons for selection of this system over others available.

1.3 VENTILATION

Describe the system to be used, including amount of fresh air required in various areas, the type of filtration required, and OSHA requirements.

Describe the smoke removal systems to be used.

Describe the summer and winter operation of the system.

1.4 AIR CONDITIONING

Provide a complete description and/or schematics of the air conditioning system proposed, including an explanation of why that system is being selected over others. Indicate locations of major components of the system.

Include a statement of special dehumidification requirements, special filtration requirements.

Provide a statement of any special architectural features incorporated to reduce cooling loads. Describe any features in the system which will reduce energy consumption.

1.5 HVAC CONTROL SYSTEM

Provide a brief description of the control system and how it is to be interfaced to the Terminal Master Energy Management Automation System.

1.6 ENERGY CONSERVATION

Provide either computer analysis (Trace, DOE2, or equal) or modified bin method analysis (ASHRAE 1985 Fundamentals Chapter 28) to estimate total annual energy consumption. The estimated annual energy consumption of spaces inside the terminal buildings shall not exceed 60,000 BTU/SQ FT/YR.

Energy required to operate central utility chilled and heated water systems supplying the space shall be chargeable to the space. Space design energy budgets include the energy required for space heating, space cooling, domestic hot water, and lighting. Space design energy budgets relate to gross square footage. All measurements shall be from the exterior wall of the affected space or from the center line of party walls.

For the purposes of calculating energy budgets, the following conversion factors shall be used:

Electricity	3,413 BTU per kWh
Natural Gas	1,030,000 BTU per MCF

2.0 ELECTRICAL

2.1 INTERIOR DISTRIBUTION SYSTEMS

Provide:

Electrical Characteristics (phase, voltage, conduit, and number of wires) of circuits.

Breakdown of the estimated connected load to:

- a. Lighting and convenience outlet load.
- b. Power load for building equipment, such as HVAC.
- c. Loads for special operating equipment such as compressors, generators, pumps, and for power receptacles being provided for special equipment.

Apply an appropriate demand factor to each to compute total demand load.

Describe the type of wiring system, such as rigid conduit, EMT, nonmetallic sheathed cable, etc, and locations.

Provide the proposed standards of design, such as voltage drop, lighting intensities, and type of lighting fixtures, and a statement regarding the use of selective switching or other energy conserving features.

Provide description, including calculations, of short circuit duty required for all protective devices and switchgear.

Provide determination of the adequacy of the outside distribution system, at the point of takeoff, to accept the new loadings imposed. If the project is a retrofit/renovation, it is incumbent upon the designer to make an evaluation of the loads being replaced and/or abandoned in order to assess the impact of the new systems.

## 2.2 OUTSIDE DISTRIBUTION SYSTEMS

Provide:

Statement relative to the adequacy of the primary supply at the point of take-off. If primary source is inadequate, state measures proposed to correct the deficiency.

Electrical characteristics of power supply to station, or portion involved, including circuit interrupting requirements and voltage regulation.

Estimate of total connected load and resulting kilowatt demand load by applying proper demand and diversity factors, if a group of loads is involved.

Basis for selection of primary and/or secondary distribution voltage.

Type of conductors, such as rubber insulated, thermoplastic insulated, PVC jacket, etc., and locations.

Proposed standards of design, such as voltage drop, lighting intensities, and type of lighting fixtures, and a statement regarding the use of selective switching or other energy conserving features.

Description, including calculations, of short circuit duty required for all protective devices and switchgear.

Statement relative to the adequacy of the existing outside distribution system, at the point of takeoff, to accept the new loadings imposed. If the project is a retrofit/renovation, it is incumbent upon the designer to make an evaluation of the loads being replaced and/or abandoned in order to access the impact of the new systems.

## 2.3 LIGHTING

Provide statement of conformance with lighting power limitations for all spaces as described in the "Guidelines and Energy Conservation Parameters for Terminal Facilities".

3.0 FIRE PROTECTION EXTINGUISHING SYSTEMS

- 3.1 Indicate authority for installation of sprinkler systems.
- 3.2 Indicate hazard rating of occupancy and design density for hydraulic calculated systems.
- 3.3 Flow test shall be performed on the main nearest the proposed point of connection to determine the available residual pressure at design flow. This information shall appear in the basis of design and the specifications.

4.0 WATER SUPPLY

Provide:

- 4.1 Explanation of existing system, covering particularly the type, capacity, condition, and present water use.
- 4.2 Statement of type of construction proposed, materials proposed for mains, etc.

5.0 PLUMBING

- 5.1 Indicate number of each type of fixture based upon the number of persons to be served.
- 5.2 Describe materials proposed for water pipe, soil pipe, stacks, etc.
- 5.3 Provide estimated number of fixture units and water demand in gpm for all plumbing fixtures.
- 5.4 Provide estimated maximum and minimum water pressure at the point of connection.
- 5.5 Indicate type and size of domestic hot water heater.

6.0 SEWERS AND SEWAGE DISPOSAL SYSTEMS

Provide:

- 6.1 Explanation of existing system covering the type, capacity, condition, present flow, and unsatisfactory elements of component parts for major extensions.
- 6.2 Interpretation of degree of treatment necessary by effluent requirements and units necessary for treatment.